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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/066,658	02/06/2002	Yan-Xiu Zheng	06720.0083-	5725

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Finnegan, Henderson, Farabow,  
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Washington, DC 20005-3315

EXAMINER

TORRES, JOSEPH D

ART UNIT PAPER NUMBER

2133

DATE MAILED: 07/12/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

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## Office Action Summary

Application No.

10/066,658

Applicant(s)

ZHENG ET AL.

Examiner

Joseph D. Torres

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 20 May 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-44 is/are pending in the application.
- 4a) Of the above claim(s) 1-34 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 35-44 is/are rejected.
- 7) ☒ Claim(s) 35-37 and 39-42 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 April 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 4.
- 4) ☒ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. 4.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Election/Restrictions***

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-4 and 20-23, drawn to An Encoder comprising: a Primary Encoding Means, an Interleaving Means and a Secondary Encoding Means; classified in class 714, subclass 755.
  - II. Claims 5-17 and 24-32 (Note : the Examiner is assuming that claim 30 depends from claim 24 not from claim 23), drawn to A Decoder comprising a Primary Decoding Means, an Interleaving Means, a Secondary Decoding Means and a De-Interleaving Means; classified in class 714, subclass 794.
  - III. Claims 18, 19, 33 and 34, drawn to A System comprising an Output Means for Combining and Sending the Source Sequence of Symbols and a Receiving Means for Receiving the Sequence of Received Symbols from the Medium; classified in class 714, subclass 776.
  - IV. Claims 35-44, drawn to An Interleaver and De-Interleaver for Performing Intra-Block Permutations on a Sequence of Symbols to Produce an Intra-Block Permuted Sequence; and Means for Performing Inter-Block Permutations on the Intra-Block Permuted Sequence of Symbols: classified in class 714, subclass 701.

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The inventions are distinct, each from the other because of the following reasons:

Inventions Group I; An Encoder comprising: a Primary Encoding Means, an Interleaving Means and a Secondary Encoding Means; and Group IV; An Interleaver and De-Interleaver for Performing Intra-Block Permutations on a Sequence of Symbols to Produce an Intra-Block Permuted Sequence; and Means for Performing Inter-Block Permutations on the Intra-Block Permuted Sequence of Symbols; are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination Group I; An Encoder comprising: a Primary Encoding Means, an Interleaving Means and a Secondary Encoding Means; as claimed does not require the particulars of the subcombination Group IV; An Interleaver and De-Interleaver for Performing Intra-Block Permutations on a Sequence of Symbols to Produce an Intra-Block Permuted Sequence; and Means for Performing Inter-Block Permutations on the Intra-Block Permuted Sequence of Symbols; as claimed because the combination does not require inter-block permutations on the intra-block permuted sequence of symbols. The subcombination has separate utility such as in serially concatenated product codes.

Inventions Group II; A Decoder comprising a Primary Decoding Means, an Interleaving Means, a Secondary Decoding Means and a De-Interleaving Means; and Group IV; An Interleaver and De-Interleaver for Performing Intra-Block Permutations on a Sequence

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of Symbols to Produce an Intra-Block Permuted Sequence; and Means for Performing Inter-Block Permutations on the Intra-Block Permuted Sequence of Symbols; are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination Group II; A Decoder comprising a Primary Decoding Means, an Interleaving Means, a Secondary Decoding Means and a De-Interleaving Means; as claimed does not require the particulars of the subcombination, Group IV; An Interleaver and De-Interleaver for Performing Intra-Block Permutations on a Sequence of Symbols to Produce an Intra-Block Permuted Sequence; and Means for Performing Inter-Block Permutations on the Intra-Block Permuted Sequence of Symbols; as claimed because the combination does not require inter-block permutations on the intra-block permuted sequence of symbols. The subcombination has separate utility such as for maximum likelihood decoding.

Inventions Group III; A System comprising an Output Means for Combining and Sending the Source Sequence of Symbols and a Receiving Means for Receiving the Sequence of Received Symbols from the Medium; and Group IV; An Interleaver and De-Interleaver for Performing Intra-Block Permutations on a Sequence of Symbols to Produce an Intra-Block Permuted Sequence; and Means for Performing Inter-Block Permutations on the Intra-Block Permuted Sequence of Symbols; are related as

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combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination Group III; A System comprising an Output Means for Combining and Sending the Source Sequence of Symbols and a Receiving Means for Receiving the Sequence of Received Symbols from the Medium; as claimed does not require the particulars of the subcombination Group IV; An Interleaver and De-Interleaver for Performing Intra-Block Permutations on a Sequence of Symbols to Produce an Intra-Block Permuted Sequence; and Means for Performing Inter-Block Permutations on the Intra-Block Permuted Sequence of Symbols; as claimed because the combination does not require inter-block permutations on the intra-block permuted sequence of symbols. The subcombination has separate utility such as for maximum likelihood decoding.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

Because these inventions are distinct for the reasons given above and the search required for Group IV is not required for Groups I, II, and III, restriction for examination purposes as indicated is proper.

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Because these inventions are distinct for the reasons given above and the search required for Groups I, II, and III is not required for Group IV, restriction for examination purposes as indicated is proper.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

During a telephone conversation with Kenie Ho on 23 June 2004 a provisional election was made without traverse to prosecute the invention of Group IV, claims 35-44.

Affirmation of this election must be made by applicant in replying to this Office action.

Claims 1-34 are withdrawn from further consideration by the examiner, 37

CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

***Drawings***

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: '507' in Figure 5B; '700' & '710' in Figure 7; and '930' in Figure 9. Corrected drawing sheets, or amendment to the specification to add the reference character(s) in the description, are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The drawings are objected to because '301', '401', '402', '410', '412', '420' should be written on one line so that they are recognizable. Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered



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and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

3. The disclosure is objected to because of the following informalities: MPEP § 2164.08(a) states, "A single means claim, i.e., where a means recitation does not appear in combination with another recited element of means, is subject to an undue breadth rejection under 35 U.S.C. 112, first paragraph. In re Hyatt, 708 F.2d 712, 714-715, 218 USPQ 195, 197 (Fed. Cir. 1983) (A single means claim which covered every conceivable means for achieving the stated purpose was held nonenabling for the scope of the claim because the specification disclosed at most only those means known to the inventor.). Claims 43 and 44 are single means claims, hence the specification is objected to since it only discloses those means known to the inventor. Appropriate correction is required.

The disclosure is objected to because of the following informalities: Claim 42 contains subject matter which was not described in the specification in such a way as to enable

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one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Figure 5A teaches that inter-block permutation begins on block cycle after intra-block permutations, hence inter-block permutation and intra-block permutations are not performed simultaneously. Furthermore, a single inter-block permutation is required for multiple intra-block permutations.

Appropriate correction is required.

### ***Claim Objections***

4. Claims 35-37 and 39-42 are objected to because of the following informalities:

Claims 35 and 39 lack a period at the end of the claims.

Claims 36, 37 and 40-42 depend from respective claims 35 and 39.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 43 and 44 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. MPEP § 2164.08(a) states, "A single means claim, i.e., where a means

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recitation does not appear in combination with another recited element of means, is subject to an undue breadth rejection under 35 U.S.C. 112, first paragraph. In re Hyatt, 708 F.2d 712, 714-715, 218 USPQ 195, 197 (Fed. Cir. 1983) (A single means claim which covered every conceivable means for achieving the stated purpose was held nonenabling for the scope of the claim because the specification disclosed at most only those means known to the inventor.). Claims 43 and 44 are single means claims.

Claim 42 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Figure 5A teaches that inter-block permutation begins on block cycle after intra-block permutations, hence inter-block permutation and intra-block permutations are not performed simultaneously. Furthermore, a single inter-block permutation is required for multiple intra-block permutations.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 42 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. A single inter-block permutation is required for multiple intra-

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block permutations. The statement, "wherein the intra-block and inter-block permutations are performed simultaneously", does not make sense, hence is indefinite.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 35-37 and 39-42 are rejected under 35 U.S.C. 102(e) as being anticipated by Suda; Hirohito et al. (US 6553516 B1, hereafter referred to as Suda).

35 U.S.C. 102(e) rejection of claims 35, 39 and 42.

Suda teaches a device used for interleaving in turbo codes (Interleaver 22 in Figure 3 of Suda is a device used for interleaving in turbo codes), comprising: means for performing intra-block permutations on a sequence of symbols to produce an intra-block permuted sequence (Second Stage Intra-Permutation Block 42 in Figure 5 of Suda is a stage for performing intra-row permutations on a sequence of symbols to produce an intra-row permuted sequence; Note: a row is a block of data); and means for performing inter-block permutations on the intra-block permuted sequence of symbols (Third Stage Inter-Permutation Block 43 in Figure 5 of Suda is a stage for performing inter-row

permutations on the intra-row permuted sequence of symbols received from Second Stage Intra-Permutation Block 42).

35 U.S.C. 102(e) rejection of claims 36 and 40.

Suda teaches that the means for performing intra-block permutations re-orders symbols within blocks of the sequence of symbols of a first length (Second Stage Intra-Permutation Block 42 in Figure 5 of Suda is a means for performing intra-block permutations to re-order bits within rows of the sequence of bits of a first row length; Note: a bit is a symbol and a row is a block).

35 U.S.C. 102(e) rejection of claims 37 and 41.

Suda teaches that the means for performing inter-block permutations re-order symbols within blocks of the intra-block permuted sequence of symbols of a second length (Third Stage Intra-Permutation Block 42 in Figure 5 of Suda is a means for performing intra-block permutations to re-order rows within matrices of the intra-block permuted sequence of symbols of a second length; Note: a matrix is a block and a sequence of rows is a sequence of symbols of a second length).

8. Claims 38, 43 and 44 are rejected under 35 U.S.C. 102(e) as being anticipated by Kim; Min-Goo et al. (US 6598202 B1, hereafter referred to as Kim).

35 U.S.C. 102(e) rejection of claims 38, 43 and 44.

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Claim 9 in Kim teaches a means for performing intra-row permutations on a sequence of symbols to produce an intra-row permuted sequence and means for performing inter-row permutations on the intra-row permuted sequence of symbols (Note: a row is a block of data). Col. 5, lines 61-67 in Kim teaches that a deinterleaver performs the same operations as the interleaver on the intra-row and inter-row permuted interleaved data but in reverse order to recover the original non-interleaved sequence.

### ***Conclusion***

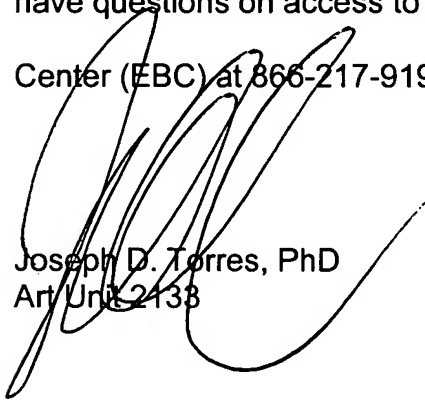
9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Shiu; Da-shan et al. (US 6392572 B1) teaches a buffer structure for storing intermediate results for a Turbo decoder.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph D. Torres whose telephone number is (703) 308-7066. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert Decady can be reached on (703) 305-9595. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Joseph D. Torres, PhD  
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